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# DESIGNING A PERFORMANCE INCENTIVE MECHANISM FOR PEAK LOAD REDUCTION: A STRAW PROPOSAL

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## INTRODUCTION

This white paper provides recommendations for designing a Performance Incentive Mechanism (PIM) for peak load reduction to incent utilities to build less capacity and increase system efficiency. The paper's recommendations are split into two parts: metric design and compensation structure.

On metric design, the paper provides two recommendations:

1. Use an outcome-oriented metric. Regulators considering setting targets for peak reduction should adopt percentage reduction in peak load as a metric. This is preferable to a megawatt reduction target because of the ease of setting and tracking performance between utilities, if there is more than one. The target performance level should reflect achievable potential, and should be adjusted to account for weather changes relative to a start year.
2. Compensate for long-term performance. The target should be set at least five (and up to eight) years in advance to allow the utility time to provide a consistent signal to support utility investment, transform the market, experiment, and innovate. This long-term target should be supported by annual interim targets that ensure utilities are on track to meet the long-term target.

On compensation structure:

1. For a PIM, use a sloped incentive bounded by upper and lower caps to drive utility behavior.
2. Take an adaptive, gradual approach to PIM compensation. To begin, specify metrics and clear methodologies, require regular measurement and reporting, and start with small amounts of revenue to reduce the risk of overcompensation for peak reduction.
3. Size the PIM large enough to affect utility behavior. Use an experimental approach to overcome incentives to invest in capital-based solutions to meet peak demand.
4. Scale the PIM with total benefits. In order to assess the value of peak reduction, regulators should commission an independent study that compares benefits of peak reduction to cost, and quantifies the net benefits of achieving an ambitious but realistic

level of peak demand reduction. The resulting figure can serve as a theoretical maximum for a PIM and provide a basis for sharing benefits of peak reduction between utilities and customers.

These recommendations, in combination, provide a path toward performance-based compensation for peak reduction that minimizes the risk of arbitrary or excessive compensation while taking specific, foundation-building steps to align utility incentives with an outcome virtually all regulators and consumers value for the electricity sector.

## **WHY A PERFORMANCE INCENTIVE MECHANISM FOR PEAK LOAD REDUCTION?**

A Performance Incentive Mechanism (PIM) for peak reduction adds value because the current regulatory model does not sufficiently incent utilities to pursue system optimization through demand reduction. Under the current system of cost-of-service regulation, if peak demand increases, the utility can justify increasing capital expenditures as “prudent” or “used and useful.” Higher peak load is associated with high usage of distribution equipment, accelerating wear and tear, and often correlates with expanding distribution infrastructure (e.g. capacitors and load tap changers). Because capital investments are the utilities’ default approach to meeting peak demand, and an avenue for increasing revenue and profit,<sup>1</sup> the utility is likely to continue proposing capital solutions to peak demand unless they have an incentive to change behavior. A PIM encourages the utility to examine demand reduction as a more cost-effective alternative to capital expenditures.

As the New York Public Service Commission noted in its Staff White Paper on Ratemaking and Utility Business Models,<sup>2</sup> this pattern of utility behavior is contrary to goals for the modern electricity system made possible by new technologies. Investing in peak reduction, rather than meeting growing peak demand, will help utilities optimize the system around affordability, reliability, and environmental performance, while creating new jobs in distributed energy resource (DER) industries.

## **THE BEST METRIC FOR PEAK LOAD REDUCTION**

“Peak load reduction,” can be measured in two main ways. One is a backward-looking measure-by-measure approach under which the utility and regulator examine what reduction took place relative to what would have happened under business as usual, i.e. a counterfactual. A second option is an outcome-oriented approach that avoids counterfactual assessments of reduction measures and instead focuses on achieving outcomes.

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<sup>1</sup> Kihm, S., Lehr, R., Aggarwal, S., & Burgess, E. “You Get What You Pay For: Moving toward Value in Utility Compensation: Part One - Revenue and Profit.” *America’s Power Plan*. June 2015.

<sup>2</sup> *New York Dept. of Public Service*. “Staff White Paper on Ratemaking and Utility Business Models.” Case 14-M-0101, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision (p. 3-4). July 28, 2015.

The second approach to peak reduction is preferable because it is easy to measure, transparent, and avoids the controversy and arbitrariness that a counterfactual approach can yield.<sup>3</sup> **For these reasons, we recommend a metric for percentage reduction in real-world, measurable peak demand to drive utility performance under a PIM.**

## **THE IMPORTANCE OF AVOIDING MEASURE-BY-MEASURE COUNTERFACTUAL ACCOUNTING**

One approach to measuring peak reduction is to assess, on a measure-by-measure basis, what level of peak reduction the utility achieved relative to business as usual. In theory this approach is attractive; it helps regulators attribute actual benefits to utility actions with some precision. The accounting exercise helps figure out what net benefits were achieved, allowing the regulator to apportion those benefits between utility shareholders and customers. However, there is significant downside to a measure-by-measure counterfactual accounting approach, as demonstrated by experience with energy efficiency (EE) incentives.

For example, California's Risk Reward Incentive Mechanism (RRIM) measured savings in three categories, megawatt-hours (MWh), megawatts (MW), and therms, and tied achievement of these savings to utility compensation.<sup>4</sup> Based on their performance in meeting these targets, the utilities could receive a penalty, a two-tiered bonus, or nothing at all. Utilities calculated ex ante energy savings based on measure-by-measure estimates of savings, while accounting for many exogenous factors that might affect customer uptake of energy efficiency measures, i.e. a counterfactual. These savings were then assessed ex post by the California Public Utilities Commission (CPUC).

The result was essentially a failed program.<sup>5</sup> Counterfactuals of estimated savings required controversial assumptions upon which there was little agreement between the utilities and the CPUC. The CPUC challenged utility-proposed savings estimates citing these assumptions, drastically impacting compensation. This antagonistic process, which dragged on for years, resulted in protracted disputes, arbitrary rewards and penalties, and eventually a complete overhaul of the RRIM.<sup>6</sup> Similarly, this process resulted in approximately three times higher administrative costs relative to other EE programs.<sup>7</sup>

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<sup>3</sup> Robbie Orvis. "Lessons for Designing Counterfactuals in Earnings Incentive Mechanisms: California as a Case Study," *Energy Innovation LLC*. 2016.

<sup>4</sup> Sangeetha Chandrashekeran, Julia Zuckerman, and Jeff Deason, "Raising the Stakes for Energy Efficiency - California's Risk/Reward Incentive Mechanism." *Climate Policy Initiative*. 2014.

<sup>5</sup> See generally, id.

<sup>6</sup> *California Public Utilities Commission, The Energy Division*. "Proposed Energy Efficiency Risk-Reward Incentive Mechanism and EM&V Activities."

<sup>7</sup> For the 2006-2008 RRIM program cycle, the CPUC authorized \$163 million in spending for evaluation, measurement, and verification (EM&V). The EM&V funding amounted to 7.6% of funding for the state's whole efficiency portfolio spending, which, relative to a U.S. average of 3%, is extraordinarily high: two to three times

The CPUC's requirements made it very difficult for utilities to properly estimate savings and dissuaded the utilities from achieving the goals of the program. In its own analysis, the CPUC concluded that, "if the Commission policy is intended to provide IOUs with the opportunity to earn regular and predictable earnings, as the utilities frequently maintain, then the earnings mechanism should not be dominated by a formula that is known to embody a high degree of uncertainty and variability, elements of which are not fully manageable by the utilities."<sup>8</sup> In other words, a measure-by-measure counterfactual approach was contrary to a key goal of the program – to incent utilities to accelerate efficiency in California.

The focus on measure-by-measure accounting also prevented the kind of holistic thinking about new business models, market transformation, and forms of customer engagement necessary to accelerate energy efficiency. In fact, ex post uncertainty continues to discourage utilities from proactively seeking out deep savings, instead focusing on which efficiency measures get the highest gross savings under the efficiency program.

These lessons from California's RRIM program are particularly relevant to peak demand reduction targets in other states. The peak reduction counterfactuals in the RRIM included peak reduction savings estimates that were highly disputed by the CPUC after the fact. The kind of market transformation required by aggressive peak reduction targets necessitates a system-wide shift in the role of the utility that is not conducive to adversarial ex post accounting.<sup>9</sup> Other states can leapfrog the controversial California program and instead move toward an outcome-oriented metric that better improves system efficiency.

## **BENEFITS OF AN OUTCOME-ORIENTED METRIC**

A preferable approach to attributing peak demand reduction measure-by-measure is to set the PIM target at the outcome envisioned by regulators, and allow utilities more flexibility in how they choose to achieve it.<sup>10</sup> An outcome-oriented peak demand reduction metric, for example, a percentage reduction from a start year, can provide a clear, stable trajectory that can be tied to regulatory goals while avoiding measure-by-measure estimation of savings. The target (percent change in MW) should be informed by a study of achievable potential.<sup>11</sup>

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greater than other states. "2014 State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts" (Boston, MA: Consortium for Energy Efficiency, May 1, 2015).

<sup>8</sup> Id. at 12.

<sup>9</sup> Approximately half of all savings measures are still disputed ex post in the RRIM's successor program; See: Decision Adopting Efficiency Savings and Performance Incentive Mechanism (California Public Utilities Commission 2013), Decision 12-01-005.

<sup>10</sup> See, e.g., Eric Gimon, Robbie Orvis, and Sonia Aggarwal. "Trending Topics in Electricity Today - Efficiency: Can We Accept Less Stringent Oversight If It Means Better Outcomes?" *America's Power Plan*. February 2015. <http://americaspowerplan.com/2015/02/trending-topics-in-electricity-today-efficiency-can-we-accept-less-stringent-oversight-if-it-means-better-outcomes/>.

<sup>11</sup> See "The appropriate scale of a peak reduction PIM," section below.

There are some downsides to this approach to measurement as well. First, it does not totally avoid arguments over counterfactual assumptions. There will be disagreements, for example, over the results of an achievable potential study and its assumptions. But any disagreements about achievable potential could be hashed out through a rate case or distribution system planning process before an incentive is actually implemented, ensuring that after the target is set the utility and regulator have a clear, transparent method for measuring performance and setting compensation.

There is also some degree of adjustment required when using this type of metric to account for changes in the economy, weather, and other inputs to energy demand. One way to mediate against this is to measure a rolling three-year average, instead of each year individually, to capture the trend while reducing the impact of severe or unusual weather on utility performance.<sup>12</sup> There are other weather-based adjustments to consider that are commonplace in natural gas utilities. While adjustments are not perfect, they are more transparent than the assumptions underlying measure-by-measure estimates (e.g. heating and cooling degree days are easily measured) and further avoid controversy.

**Recommendation:** To measure peak demand reduction performance, states should adopt percentage reduction in peak load as a metric. This is preferable to a MW reduction target because of the ease of setting and tracking performance between utilities. The target performance level should reflect achievable potential, and should be adjusted to account for weather changes relative to a start year. Any adjustments should be clear ahead of time to provide maximum transparency and certainty to the utility and stakeholders on the expectations for compensation relative to performance.

The target should be set at least five, and up to eight, years in advance<sup>13</sup> to allow the utility time to provide a consistent signal to support utility investment, transform the market, experiment, and innovate. This long-term target should be supported by annual interim targets that ensure

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<sup>12</sup> See Robbie Orvis, Sonia Aggarwal, & Michael O’Boyle. “Metrics for Energy Efficiency: Options and Adjustment Mechanisms.” *Energy Innovation* LLC. April 2016.

<sup>13</sup> As recognized in the Staff Report and Proposal initiating New York’s Reforming the Energy Vision, “Extending the length of the rate plan (to as long as eight years...) may provide benefits such as better planning, more certainty, and fewer rate cases. This may give utilities the time and opportunity to implement an innovative “sea change.” An extended rate plan will create very powerful efficiency incentives (for both capital and operating expenditures) since utilities may reap more of the benefits of efficiencies until rates are reset. The term may enable utility management to focus less on rate matters and more on performance and customer goals.” New York Public Service Commission, “Reforming the Energy Vision”, 14-M-0101, April 24, 2014, at p. 50.

This was the case in Maryland. The state of Maryland put forth a 15% per capita goal of peak reduction over 7 years (start of 2009 through end of 2015) and will very nearly achieve that goal. The Maryland Public Service Commission noted that many programs were slow to start, but picked up in 2013-2014. This supports an approach for long-term goals, as a 5-year program may be just getting started as it nears its final target dates. An implementation period of 7+ years is therefore preferred to a 5-year or shorter time frame. Public Service Commission of Maryland, “The EmPOWER Maryland Energy Efficiency Act Standard Report of 2015 (p. 30).” April 2015.

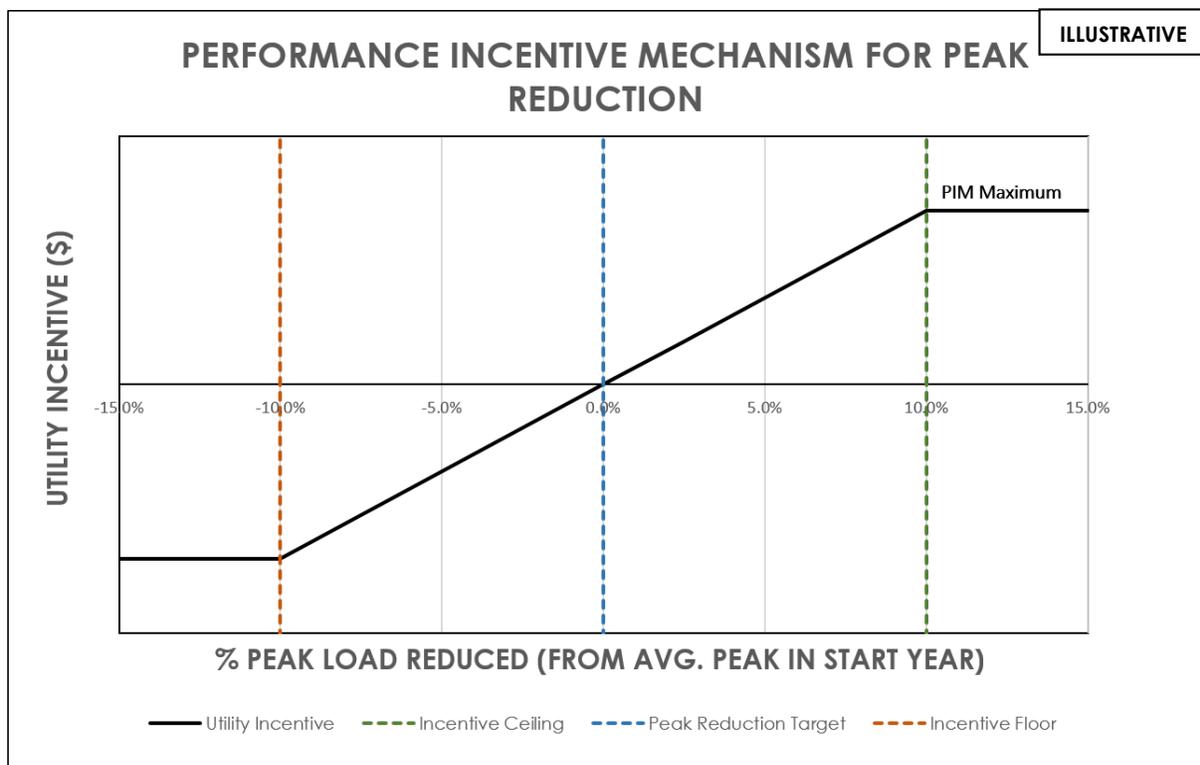
utilities are on track to meet the long-term target. Like the long-term target, the interim targets should be based on peak reduction from the same start year.

## REWARDING PERFORMANCE UNDER A PEAK LOAD REDUCTION PIM

### INCENTIVE STRUCTURE

We recommend a sloped symmetrical incentive bounded by upper and lower caps to drive utility behavior. A symmetrical incentive is paired with a penalty for poor performance, or failure to meet the performance target, while an asymmetrical incentive is reward- or penalty-only. Symmetrical incentives have the advantage of motivating utilities, particularly if an incentive-only PIM is not producing results. The symmetrical approach simulates competitive pressure by penalizing the utility shareholders if the company fails to create value for customers.

A symmetrical approach with penalties as well as rewards is preferable to an incentive-only structure, but incentive-only structures may be a lower-risk incremental step if there is significant uncertainty around the ability of the utility to perform or a high perception of risk. However, the principles of incentive design below can be applied to either form.



Achievable potential for peak reduction varies between states, so any compensation structure tied to a metric should start from an assessment of achievable potential for peak reduction.

However, states may want to assess the zone of reasonableness by starting with a FERC study of demand response potential in each state.<sup>14</sup>

There are at least three benefits to a sloped incentive bounded by upper and lower caps:

1. A sloped function is easy to construct, understand, predict, and adjust as the Commission and utilities gain experience.<sup>15</sup>
2. A symmetrical incentive simulates competitive pressure by linking utility incentives with public policy objectives articulated by regulators.
3. The upper bound can be set below the total societal value, limiting the potential for excessive financial reward and preserving value for customers.

This model for incentive design is used successfully in Vermont to compensate the EE utility,<sup>16</sup> Vermont Efficiency Investment Corporation (VEIC) for EE performance. VEIC is a non-profit third-party EE administrator that receives a bonus of up to 2.5 percent of its revenue based on performance in seven categories.<sup>17</sup> Each of the seven performance incentives is reward-only with lower and upper bounds, scaled linearly from 60-100 percent of a predetermined cap.<sup>18</sup>

For example, VEIC's summer peak reduction target approved by the Vermont Public Service Board is 41,300 kW of peak demand reduction over three years. For performance less than 31,000 kW reduction (90 percent of the modeled result), VEIC earns no incentive. At 31,000 kW reduction, VEIC earns 60 percent of the total incentive. The award is scaled linearly between

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<sup>14</sup> Faruqui, A., et al. "A National Assessment of Demand Response Potential." Prepared for the Federal Energy Regulatory Commission. 2009. The study provides an assessment of DR potential over a 10-year period between 2009 and 2019. The bulk of the report summarizes and analyzes the results of their analysis of four scenarios for DR adoption performed for every state in the nation. It also addresses current barriers to DR adoption, as well as recommendations for how to overcome those barriers.

<sup>15</sup> This is opposed to a "stepped" function, under which the utility receives no incentive until it reaches a certain level of performance, at which point it receives a reward or penalty. There can be any number of these steps. Step functions are common and can be easy to administer, but they have several important drawbacks. When the value of the penalty or reward can change dramatically with only a small change in performance, the evaluation process can become very contentious, as happened in California with the Risk/Reward Incentive Mechanism (RRIM). S. Chandrashekeran et al. "Raising the Stakes for Energy Efficiency: California's Risk/Reward Incentive Mechanism." *Climate Policy Initiative*. January 2014. In addition, sharp performance thresholds may induce a utility to engage in unsafe or unsound practices in order to avoid a large penalty or receive a large reward. Whited M., Woolf T., & Napoleon A. "Utility Performance Incentive Mechanisms: A Handbook for Regulators (p. 47)." 2015. Prepared for the Western Interstate Energy Board.

<sup>16</sup> Vermont Efficiency Investment Corporation (VEIC) is a non-profit energy efficiency administrator contracted by Vermont's energy efficiency utility (Efficiency Vermont) to serve both utilities and customers in achieving Vermont's efficiency goals.

<sup>17</sup> These categories include electricity savings (MWh), total resource benefits (\$), summer peak demand savings (kW), winter peak demand savings (kW), business competitiveness (% savings), market transformation residential (% of new construction with savings), and market transformation business (number of EE supply chain partners). "Order Determining Quantifiable Performance Indicator Targets for Efficiency Vermont and BED." Appendix A, 2013-2014 Demand Resources Plan Proceeding, Vermont Public Service Board, EEU-2013-01. October 10, 2014.

<sup>18</sup> *Id.*

31,000 and 41,300 kW (120 percent of the modeled result, or the “stretch” performance level). For performance greater than 41,300 kW reduction, VEIC can earn a set amount per kW subject to an aggregate cap on VEIC's total performance incentive for electric-efficiency.

**QPI #3: SUMMER PEAK DEMAND SAVINGS (kW)**

	Minimum	100% Target Level	Increase Rate
Achievement	31,000	41,300	\$22.55
% of model	90%	120%	Per kW between 31,000 and 41,300
% of award	60%	100%	
Award amount	\$348,401	\$580,668	

In Vermont, despite the use of measure-by-measure savings estimates,<sup>19</sup> this linear, capped incentive structure has been quite successful at motivating utility behavior and achieving net benefits for customers. From 2009-2014, VEIC hit all minimum performance requirements and hit the maximum of a majority, achieving over 95 percent of its maximum reward in consecutive three-year compliance periods.<sup>20</sup>

**THE APPROPRIATE FINANCIAL SCALE FOR A PEAK REDUCTION PIM**

Three principles should guide the magnitude of the peak reduction PIM:

1. Gain experience before scaling up the incentives and penalties. Starting small and increasing over time reduces the risk of using a gameable metric, setting an under- or over-ambitious target, or putting too much cash at stake.
2. In light of experience gained, size the PIM large enough to affect utility behavior.
3. Size the PIM relative to the customer value created by the peak reduction, as demonstrated by a peak demand reduction potential study. The incentive should never exceed total net benefits, ensuring that the utility and customers each receive a significant portion of benefits of meeting the performance target. The risk of penalties should be proportional to uncertainties about the utility’s ability to perform.

**Maintain a flexible, gradual approach to tying compensation to peak reduction performance**

As with other aspects of performance incentive mechanisms (e.g. metrics), financial incentives may need to be adjusted over time. Financial incentives are sometimes adjusted when the magnitude of the incentive is found to be unreasonably large or small, or the basis for the

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<sup>19</sup> These are relatively non-controversial in Vermont, are published and agreed to ex ante by the Vermont Public Service Board and VEIC. Because the Board mostly defers to ex ante engineering estimates, the use of counterfactuals has resulted in a much more successful program than California’s RRIM. See, e.g., “Technical Reference User Manual.” *Efficiency Vermont*. March 3, 2015, (<http://psb.vermont.gov/sites/psb/files/docketsandprojects/electric/majorpendingproceedings/TRM%20User%20Manual%20No.%202015-87C.pdf>).

<sup>20</sup> “Order Re Efficiency Vermont 2014 Savings Verification and 2012-2014 Performance Award,” *Vermont Public Service Board*. EEU-2015-03. July 29, 2015; “Order Re Efficiency Vermont 2011 Savings Verification and 2009-2011 Performance Award.” *Vermont Public Service Board*. EEU-2012-03, August 9, 2015.

financial incentive (e.g., avoided fuel costs) is found to be excessively volatile, resulting in excessive penalties or rewards.<sup>21</sup>

In order to avoid the possibility of overcompensation or excessive penalties, it is advisable to begin with small amounts of revenue and adjust these gradually upward over time if needed. In some cases, a small financial incentive may be all that is needed in order to induce the utility to achieve the desired result, thus preserving the majority of benefits for ratepayers or limiting the downside risk for the utility.<sup>22</sup>

A gradual approach allows utilities and regulators to gain experience with an incentive mechanism and manage any unforeseen consequences of the incentive without large impacts on ratepayers or shocks to utility finances. As parties gain more confidence that the PIM does not suffer from any major flaws, the amount of compensation can be increased if needed until it results in a financial incentive to produce the outcomes customers want.<sup>23</sup>

### ***Make the PIM large enough to affect utility behavior***

Where to start on a minimum incentive remains an open question, and may itself require some experimentation. Existing experience is informative, but inconclusive. Peak reduction incentives have been a part of multi-objective EE incentive programs in Texas and California, but never stand-alone PIMs.

In Texas, utilities have energy (MWh) and peak demand (MW) savings targets; if they meet 100 percent of both targets, then they receive one percent of total net benefits for each two percent exceedance of the target, capped at ten percent of net benefits. Since 2011, the incentive reward has ranged between 19 and 38 percent of EE program costs as utilities have routinely exceeded the targets—in some years it has been more than 100 percent.<sup>24</sup>

In California, the upside-only utility incentive for peak demand savings is also part of the overall Efficiency Savings and Performance Incentive (ESPI). The ESPI caps utility compensation for peak demand performance at nine percent of the budget, and scales linearly with performance.<sup>25</sup> This has produced peak demand savings at 70 percent of the full target from 2013-2015, with a corresponding incentive of 6.2 percent of program costs.<sup>26</sup>

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<sup>21</sup> Whited M., Woolf T., & Napoleon A. 2015. "Utility Performance Incentive Mechanisms: A Handbook for Regulators (p. 47)." Prepared for the Western Interstate Energy Board.

<sup>22</sup> Id. at 48.

<sup>23</sup> Id.

<sup>24</sup> See Seth Nowak et al. "Beyond Carrots for Utilities: A National Review of Performance Incentives for Energy Efficiency (p. 77-81)." *American Council for an Energy-Efficient Economy*. May 2015.

<sup>25</sup> See Seth Nowak et al. at p. 41-49; citing "Decision Adopting Efficiency Savings and Performance Incentive Mechanism." *California Public Utilities Commission*. 12-01-005, Decision no. 13-09-023, September 5, 2013.

<sup>26</sup> For specific performance reports, see California Energy Efficiency Statistics, "Energy Data Portal", <http://eestats.cpuc.ca.gov/Views/EEDataPortal.aspx>.

To gain empirical support for a utility-wide compensation scheme in line with the principle of gradualism, states could require utilities to pilot specific areas within designated substations in the most congested locations, tie different amounts of revenue to performance in each geographic area, and observe each utility's behavioral responses. This could not only lend valuable empirical evidence to support a statewide target, but it would also prioritize the most valuable measures, increasing the likelihood that the initial program is successful and allowing some learning-by-doing for utilities and regulators.

### **Use customer value to set bounds for the PIM**

The benefits of peak demand reduction can be quite large. Typically these benefits are quantified in terms of avoided costs that can be found on customer bills – avoided fuel, generation capital, transmission, and distribution costs are typically the largest of these.<sup>27</sup> Avoided costs may also include other, less obvious benefits like reduced environmental compliance costs (e.g. Clean Power Plan or state RPS compliance), avoided air pollution and greenhouse gas emission impacts, or effects on wholesale market prices.<sup>28</sup> Still other benefits are important to acknowledge but harder to quantify, such as market animation or customer engagement.

However, methodologies for calculating avoided costs of DERs are increasingly well-established, and can help reveal and preserve the value of peak reduction for customers.<sup>29</sup> Studies estimating the value of distributed solar have produced recommendations for estimating peak demand reduction benefits.<sup>30</sup> For example, using similar methodologies to best practices for valuing distributed solar PV, a recent paper from Advanced Energy Economy (AEE) estimated that peak demand reductions within the achievable potential produced a benefit-cost ratio of 3.2-4.1 in Massachusetts, and 2.6-2.8 in Illinois.<sup>31</sup>

In order to assess the value of peak reduction, states should produce a study similar to the AEE study comparing benefits of peak reduction to cost, and quantifies the net benefits of achieving an ambitious but realistic level of peak demand reduction. The resulting figure can serve as a

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<sup>27</sup> For a fuller discussion on avoided cost calculations for distributed energy resources, see, e.g., P. Denholm et al., "Methods for Analyzing the Benefits and Costs of Distributed Photovoltaic Generation to the U.S. Electric Utility System." *National Renewable Energy Laboratory*. 2014. The report lists seven categories of avoided costs to consider: energy, environmental, T&D losses, generation capacity, T&D capacity, ancillary services, and other factors.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.* See also B. Feldman, M. Tanner, & C. Rose. "Peak Demand Reduction Strategy." *Navigant Consulting* (prepared for Advanced Energy Economy). 2015.

<sup>30</sup> See e.g., P. Denholm et al. "Methods for Analyzing the Benefits and Costs of Distributed Photovoltaic Generation to the U.S. Electric Utility System."; M. Taylor et al. "Value of Solar: Program Design and Implementation Considerations." *National Renewable Energy Laboratory*. 2015.

<sup>31</sup> B. Feldman, M. Tanner, & C. Rose. "Peak Demand Reduction Strategy." *Navigant Consulting* (prepared for Advanced Energy Economy). 2015.

theoretical maximum for a peak reduction PIM; it will be up to each regulator to decide how this value should be shared between the utility and customers, and translate that decision directly into the upper earnings cap for the peak reduction PIM.

## **CONCLUSION**

A percentage reduction in peak demand from a start year is a simple, straightforward, outcome-oriented approach designed to effectively accomplish the goal of increased system efficiency and a cleaner electricity system. By proceeding gradually on the amount of revenue tied to performance, regulators can have confidence that a peak reduction PIM will have the intended effect – incenting utilities to become market makers for new DERs that maximize customer value. This begins with specifying a percentage reduction metric that regulators can begin to measure immediately. That can be followed by a potential study for peak reduction potential and value, and ultimately tying increasing revenue to the target performance level as needed to accomplish the goals.